



Towards a Low Carbon Energy Future

By

Dr. R.K. Pachauri

Chief Mentor, POP (Protect Our Planet) Movement

Former Chairman, Intergovernmental Panel on Climate Change (IPCC), 2002-2015

International Scientific and University Conference

Astana

July 12, 2017

The Rodney & Otamatea Times

WAITEMATA & KAIPARA GAZETTE.

PRICE—10s per annum in advance

WARKWORTH, WEDNESDAY, AUGUST 14, 1912.

3d. per Copy.

Science Notes and News.

COAL CONSUMPTION AFFECT- ING CLIMATE.

The furnaces of the world are now burning about 2,000,000,000 tons of coal a year. When this is burned, uniting with oxygen, it adds about 7,000,000,000 tons of carbon dioxide to the atmosphere yearly. This tends to make the air a more effective blanket for the earth and to raise its temperature. The effect may be considerable in a few centuries.

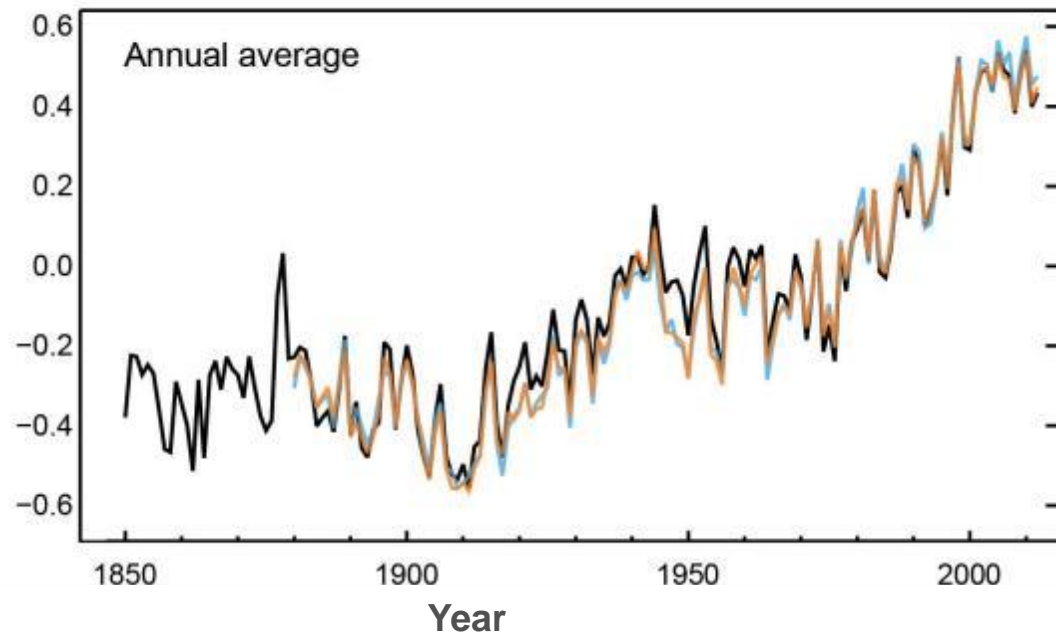
Key Messages

- **Human influence on the climate system is clear**
- **The more we disrupt our climate, the more we risk severe, pervasive and irreversible impacts**
- **We have the means to limit climate change and build a more prosperous, sustainable future**

Source: IPCC AR5 WGI SPM, IPCC AR5 WGII SPM, IPCC AR5 WGIII SPM

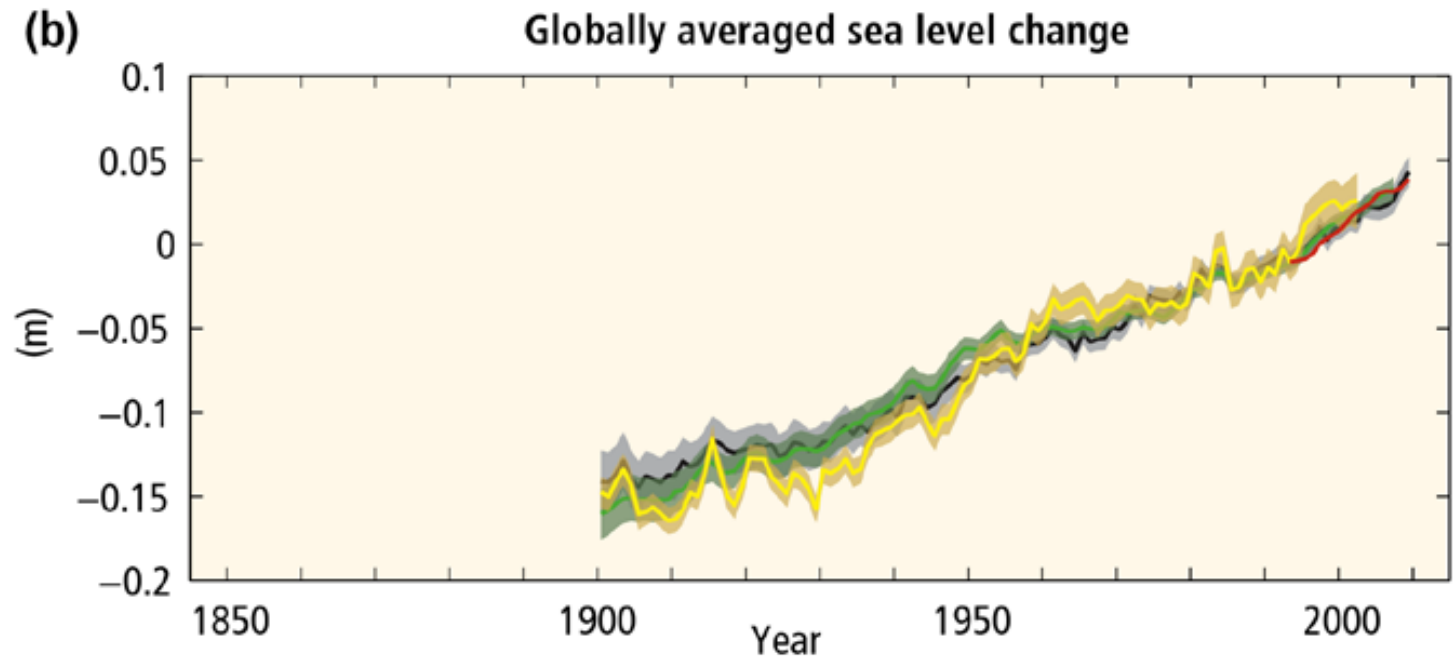
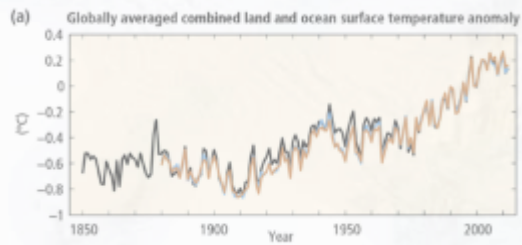
Humans are changing the climate

It is extremely likely that we are the dominant cause of warming since the mid-20th century

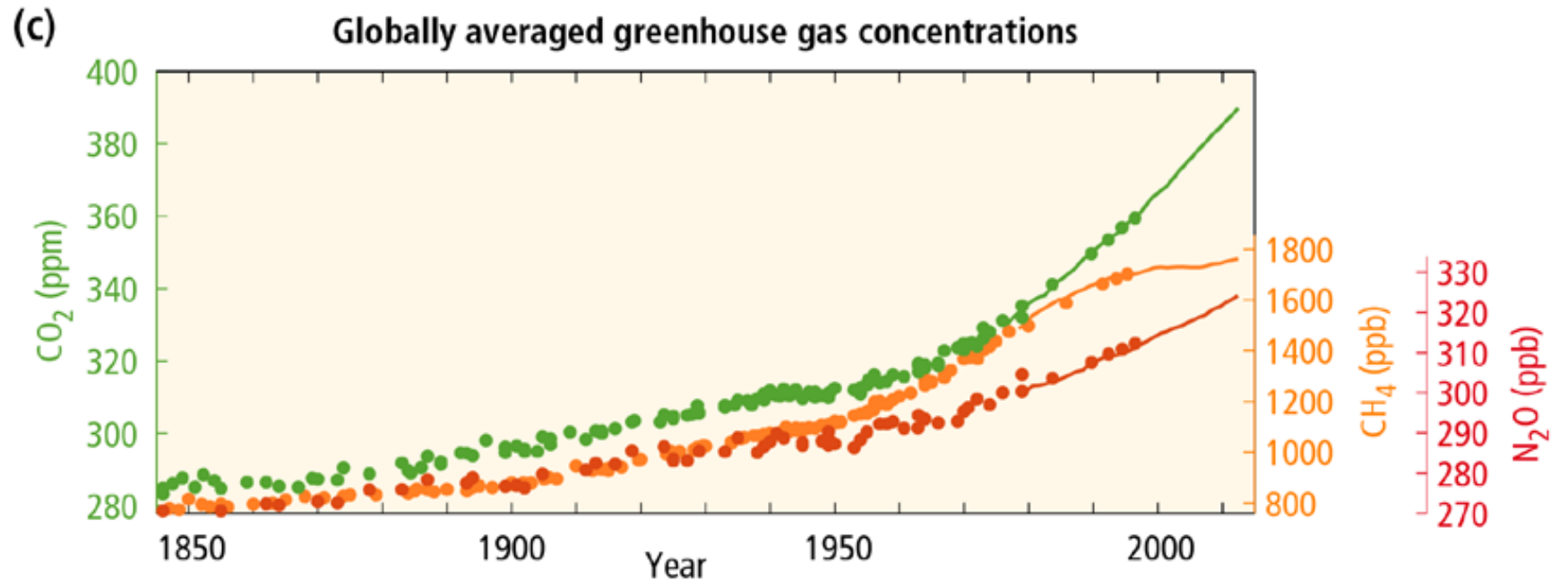
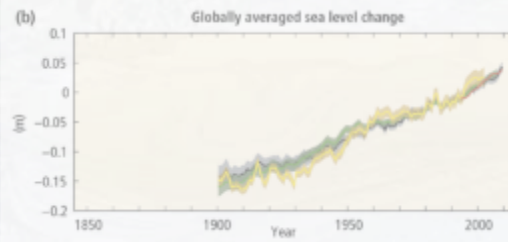
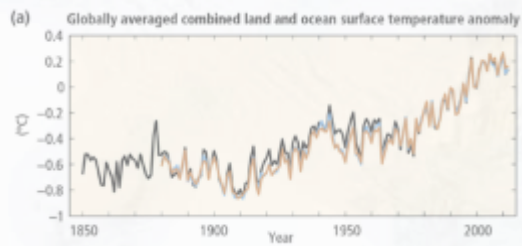


Globally averaged combined land and ocean surface temperatures

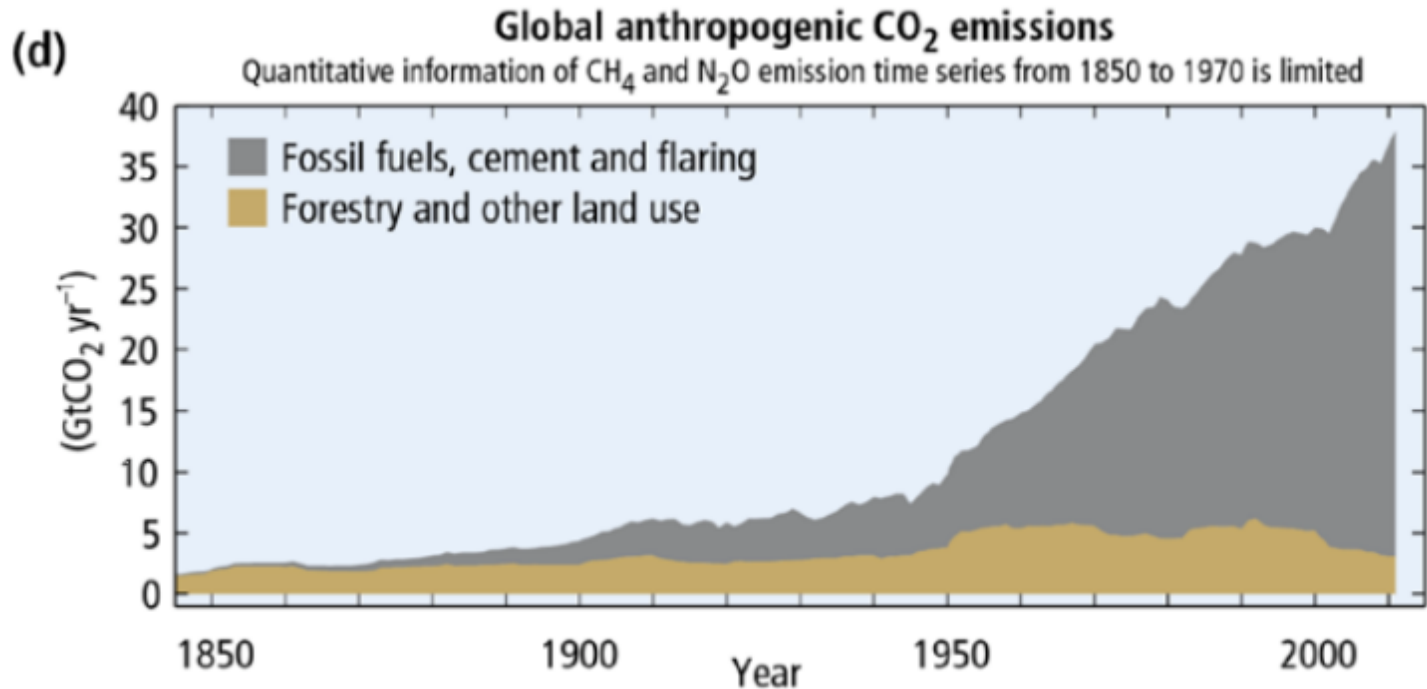
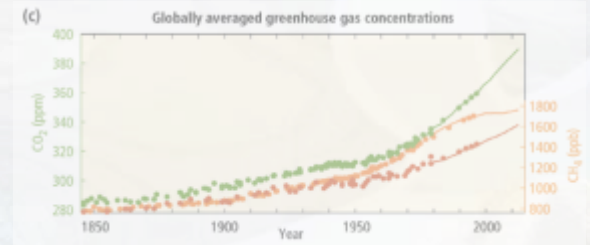
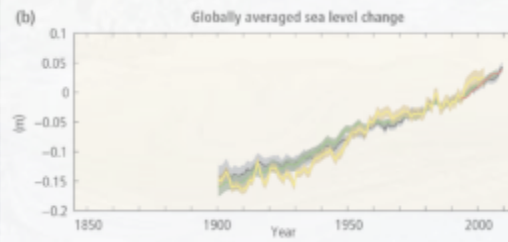
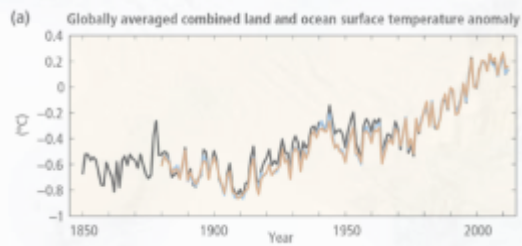
Source: IPCC AR5 WGI SPM



Source: IPCC AR5 SYR SPM



Source: IPCC AR5 SYR SPM



Source: IPCC AR5 SYR SPM

Some of the changes in extreme weather and climate events observed since about 1950 have been linked to human influence



Source: IPCC AR5 WGI SPM

Impacts are already underway

- **Tropics to the poles**
- **On all continents and in the ocean**
- **Affecting rich and poor countries**



Source: IPCC AR5 WGII SPM

Projected climate changes

Continued emissions of greenhouse gases will cause further warming and changes in the climate system



Oceans will continue to warm during the 21st century



Global mean sea level will continue to rise during the 21st century



It is very likely that the Arctic sea ice cover will continue to shrink and thin as global mean surface temperature rises



Global glacier volume will further decrease

Source: IPCC AR5 WGI SPM

Potential Impacts of Climate Change



Food and water shortages



Increased displacement of people



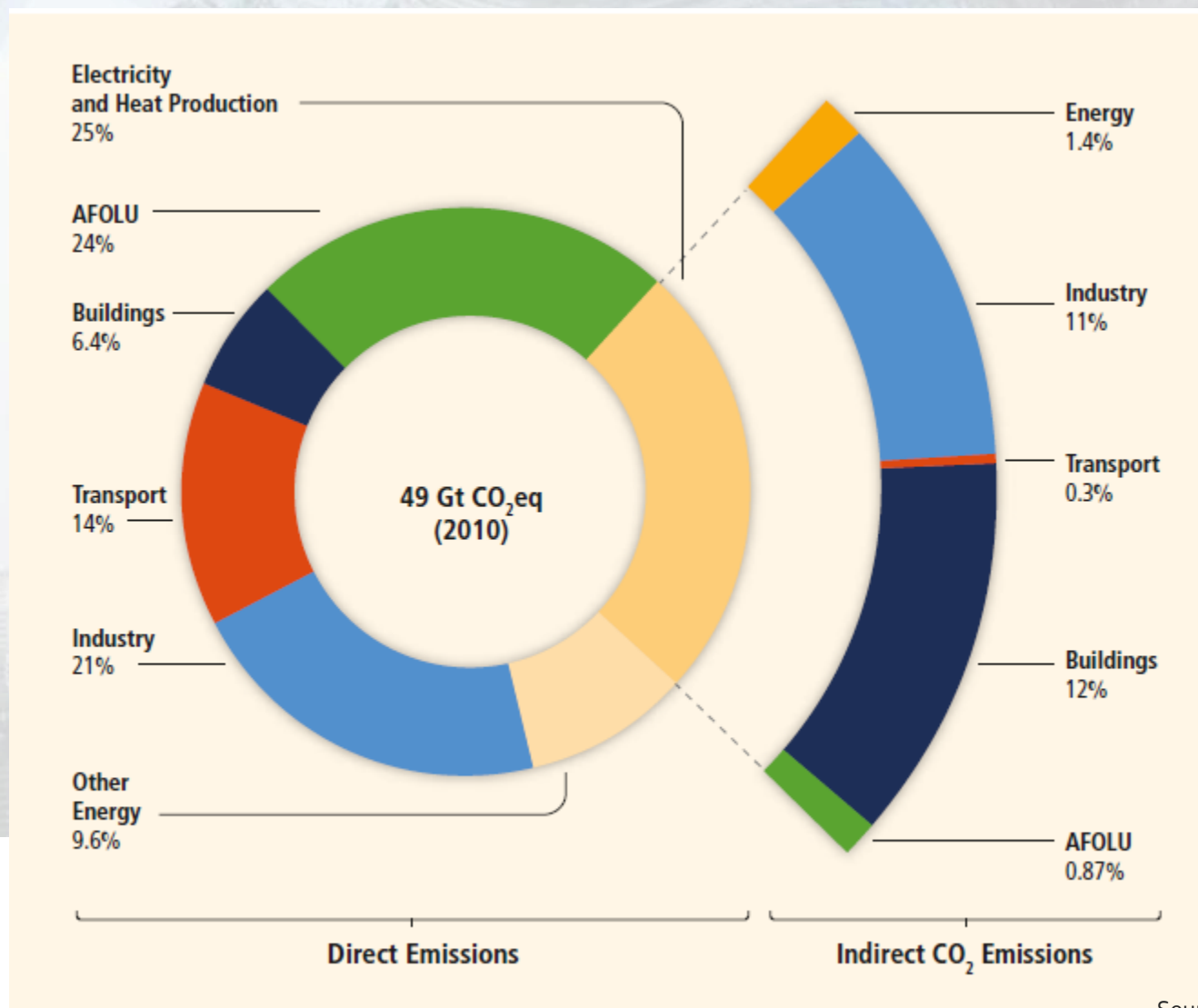
Increased poverty



Coastal flooding

Source: IPCC AR5 WGII SPM

Greenhouse Gas Emissions by Economic Sectors



Source: IPCC AR5 WGIII SPM

Limiting Temperature Increase to 2°C

Global GHG emissions reduction of 40-70 % in 2050 compared to 2010

Net zero or negative GHG emissions in 2100

Global emissions to curb within next 5-15 years

Source: IPCC AR5 WGIII SPM

Mitigation Measures



More efficient use of energy



Greater use of low-carbon and no-carbon energy

- Many of these technologies exist today
- Reduction in CO₂ emissions by 90% between 2040 and 2070 over 2010 levels



Improved carbon sinks

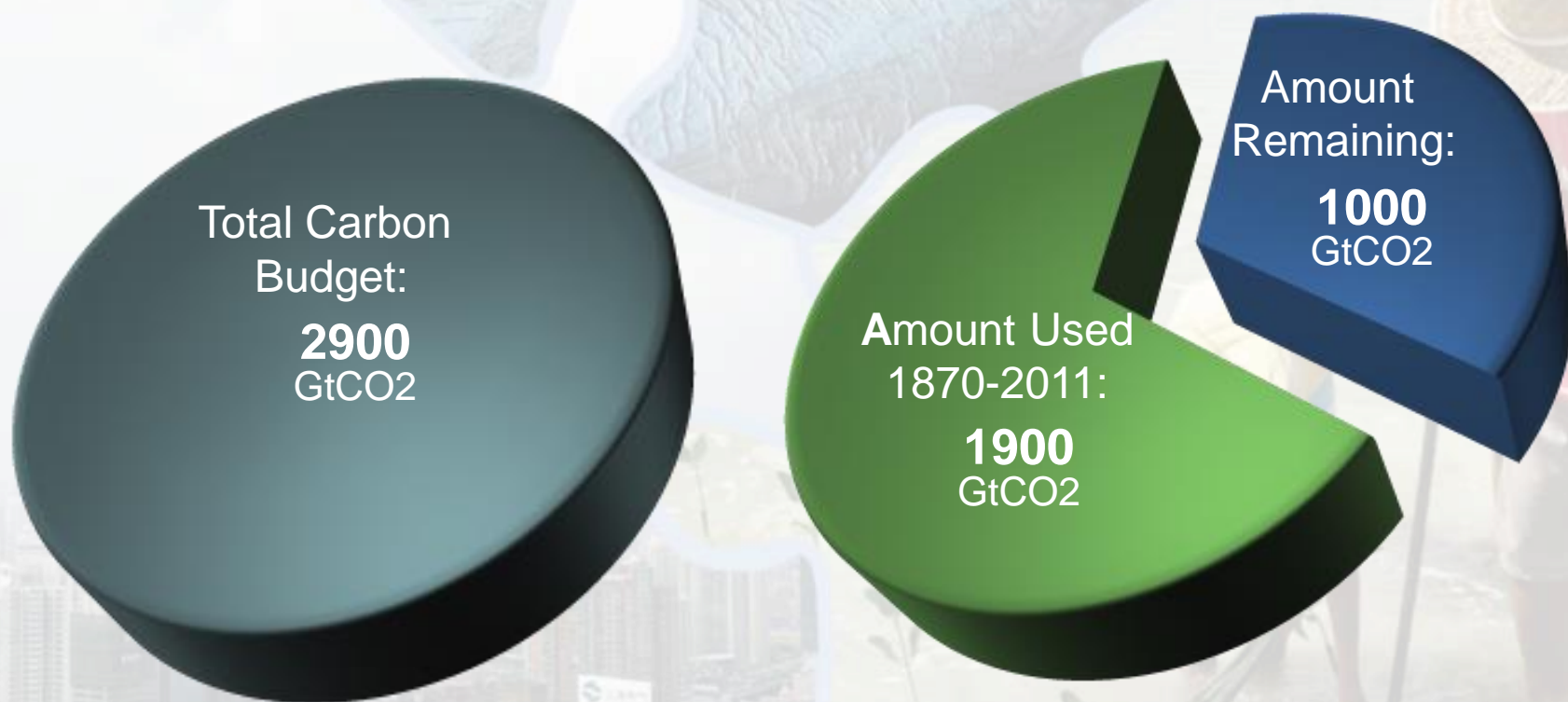
- Reduced deforestation and improved forest management and planting of new forests
- Bio-energy with carbon capture and storage



Lifestyle and behavioural changes

The window for action is rapidly closing

65% of our carbon budget compatible with a 2° C goal already used



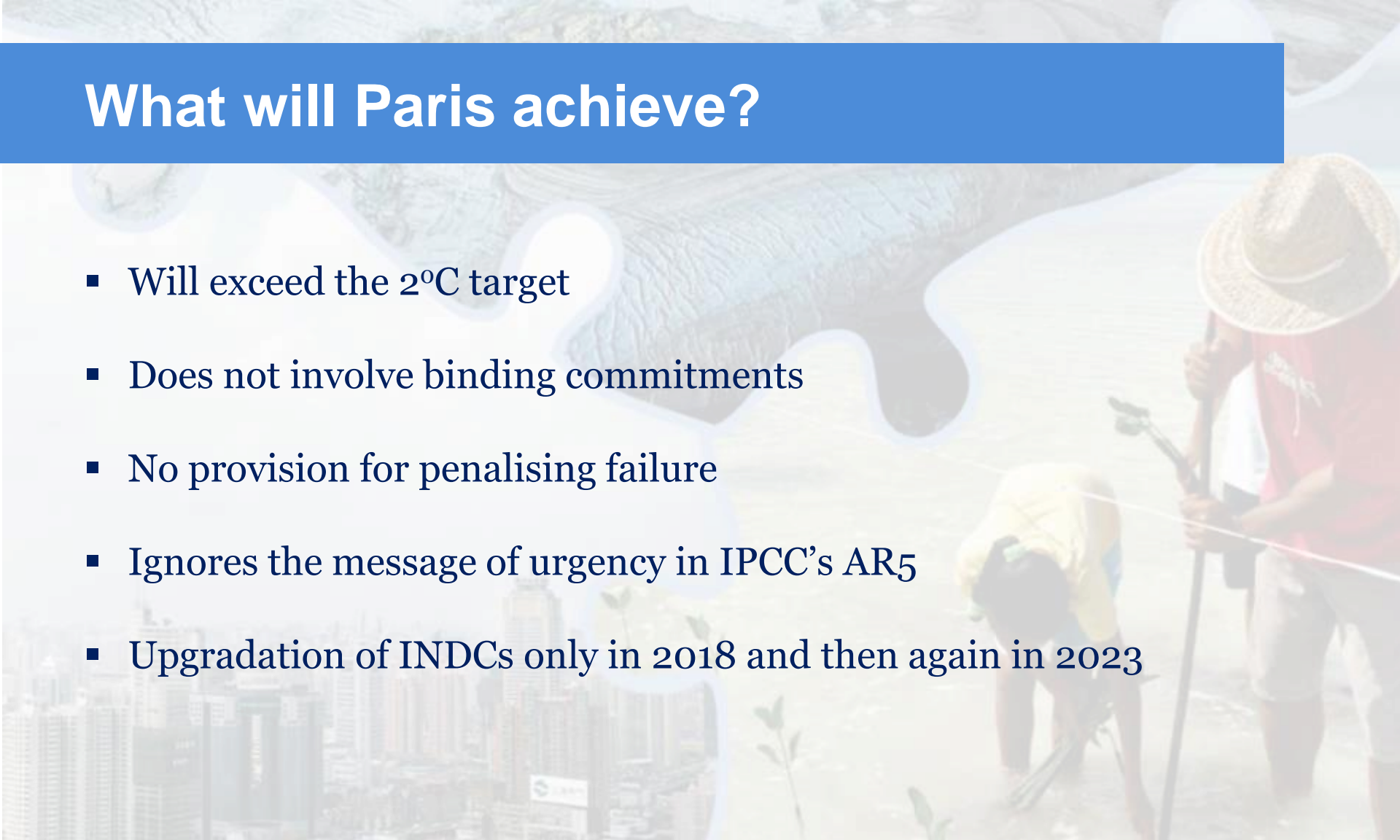
Source: IPCC AR5 WGI SPM

Policy initiatives for low carbon growth

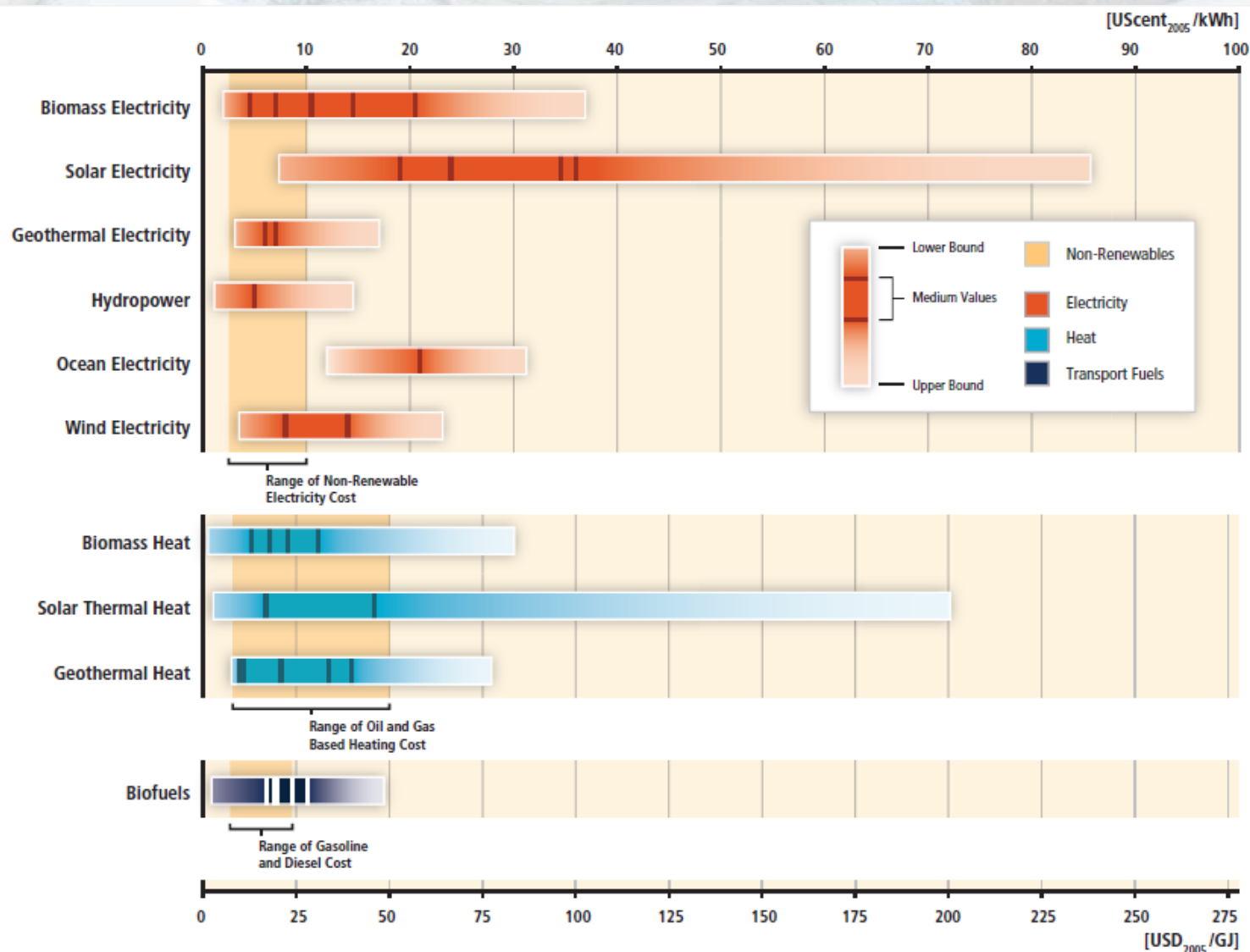
- In principle, mechanisms that set a carbon price, including cap and trade systems and carbon taxes, can achieve mitigation in a cost-effective way, but have been implemented with diverse effects due in part to national circumstances as well as policy design.
- The reduction of subsidies for GHG-related activities in various sectors can achieve emission reductions, depending on the social and economic context.
- Regulatory approaches and information measures are widely used and are often environmentally effective.
- Sub-national climate policies are increasingly prevalent, both in countries with national policies and in those without.
- Co-benefits and adverse side effects of mitigation could affect achievement of other objectives such as those related to human health, food security, biodiversity, local environmental quality, energy access, livelihoods and equitable sustainable development.
- Substantial reductions in emissions would require large changes in investment patterns.

What will Paris achieve?

- Will exceed the 2°C target
- Does not involve binding commitments
- No provision for penalising failure
- Ignores the message of urgency in IPCC's AR5
- Upgradation of INDCs only in 2018 and then again in 2023



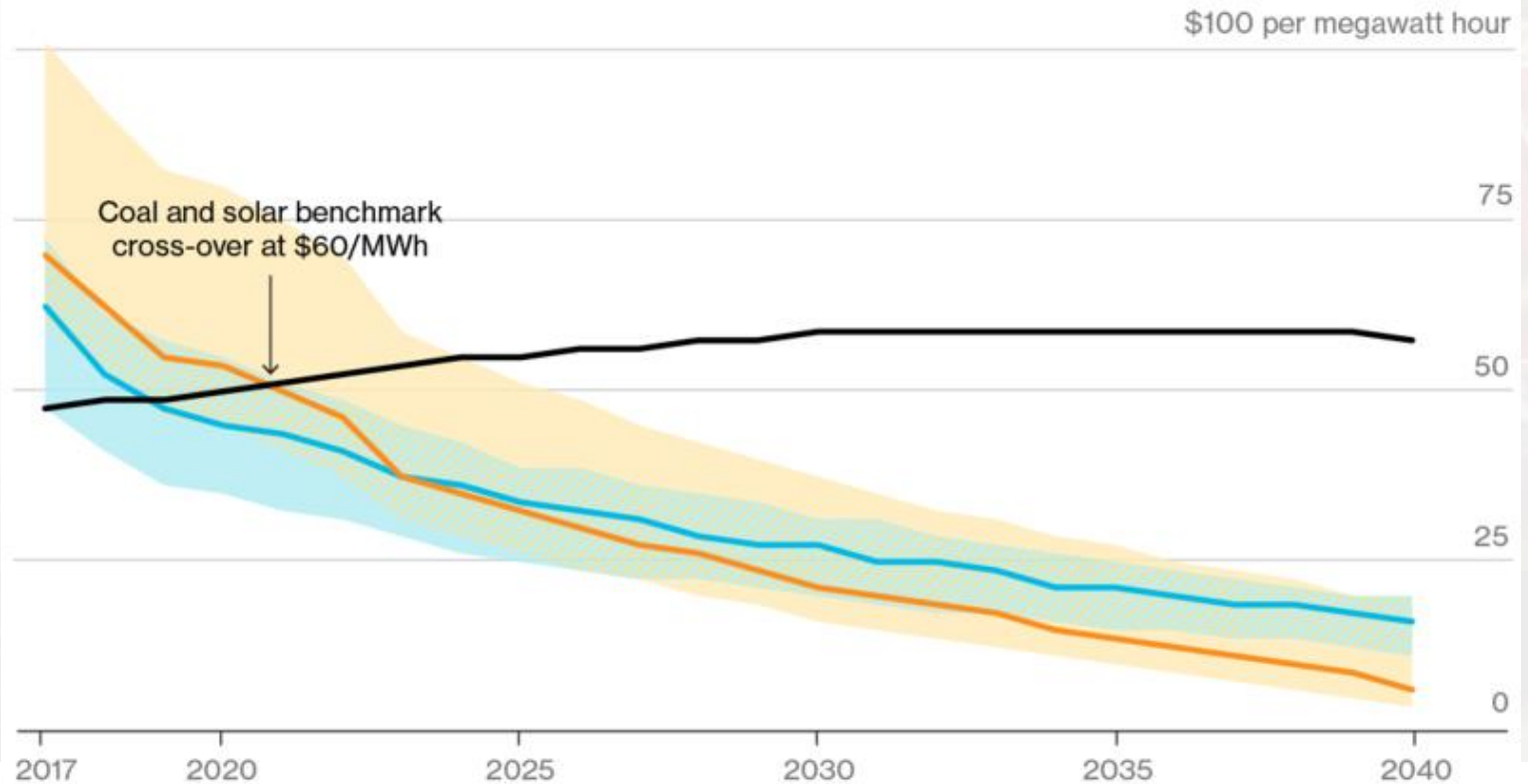
Range in recent levelized cost of energy for selected commercially available RE technologies in comparison to recent non-renewable energy costs.



China's Big Tipping Point

Within four years solar will be cheaper than coal

■ Coal ■ Onshore wind ■ Large solar farms



Levelized cost of energy based on realized load factors (2016 real). Source: BNEF

Bloomberg

Innovations for low carbon growth

- Rooftop solar in cities and large scale solar power generation outside cities.
- Towards sustainable mobility – a long term vision and immediate solutions, such as phasing out diesel buses.
- Energy efficient and resource conserving buildings – codes and regulations for new buildings and retrofits.
- Converting waste to energy.
- Involve youth in developing a roadmap.
- Lifestyle changes – e.g. diet

What is the POP Movement?

- Addresses the Urgent Need to Share Information and Knowledge Among Youth About Solutions to:
 - Achieve Sustainable Development Goals
 - Mitigate Climate Change
 - Adapt to the Impacts of Climate Change



PROTECT OUR PLANET

What Does POP Do?

- **The POP Movement:**

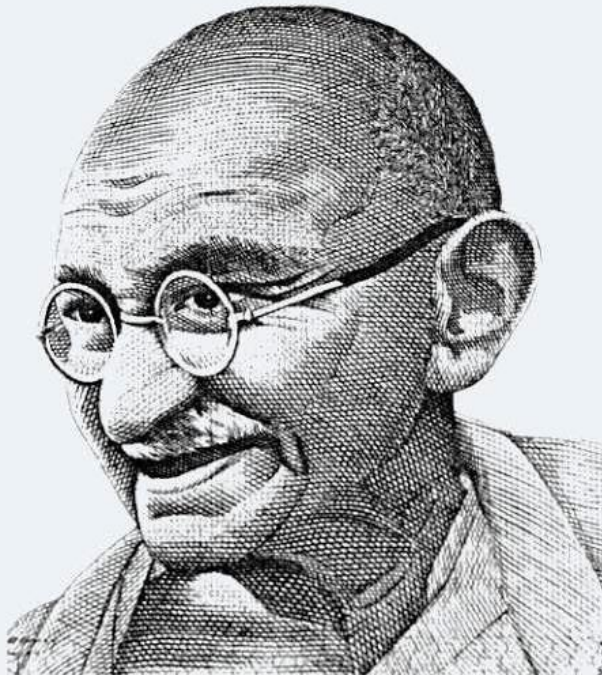
- ❖ Mobilizes Young People Globally to Protect Our Planet
- ❖ Promotes Collective Action, Especially Among Youth to Implement Solutions Needed to Mitigate Climate Change
- ❖ Recognizes and Reward Youth-Led Actions, Exemplary Initiatives, and Success Stories



PROTECT OUR PLANET

“A small body of determined spirits fired by an unquenchable faith in their mission can alter the course of history.”

- Mahatma Gandhi



If you think in terms of a year, plant a seed; if in terms of ten years, plant trees; if in terms of 100 years, teach the people.

- Confucius

